February 2015 FVEAA Newsletter

Fox Valley Electric Auto Association

The FVEAA is a Not-For-Profit Illinois Corporation and the Chicago-area chapter of The Electric Auto Association

Next Meeting

February 20, 2015

Community Christian Church

1635 Emerson Lane
Naperville, IL 60544
Google Map

Agenda

- 6:30 p.m. Doors Open
- 7:00 Call to Order, Welcome and Introductions
- 7:10 Committee Reports.
- 7:15 Old Business / New Business
- 7:25 Presentation: John Walton - Presents the Cadillac ELR
- Break - Lou Scapellato - ELR ride-n-drives
- 8:25 Presentation: Rich Carroll - Alternative Battery Chemistries
- 9:15 Close

President's Words

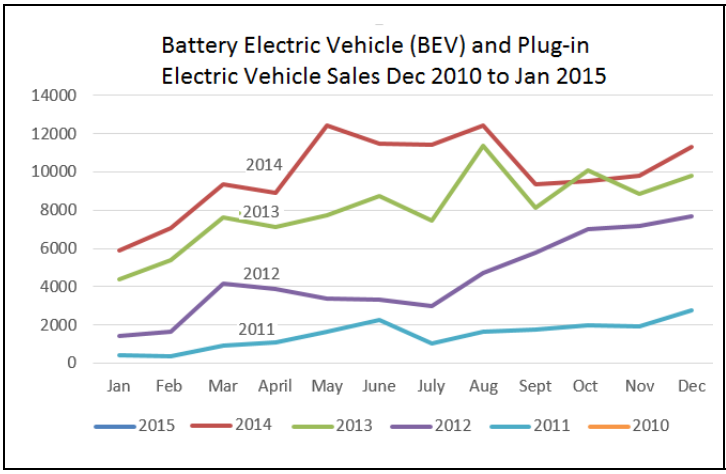
Bruce Jones

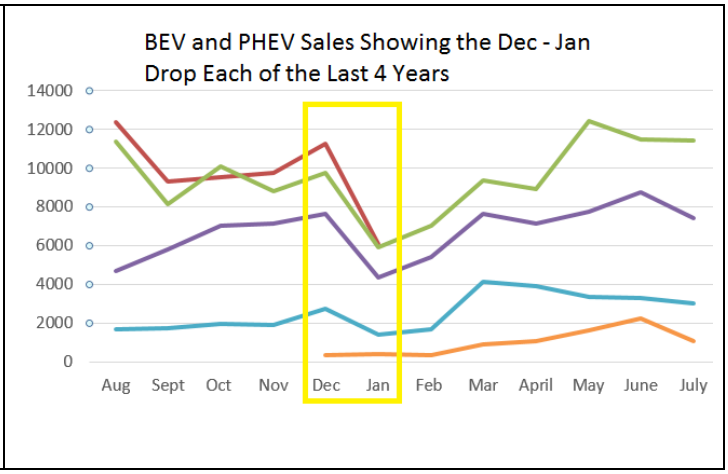
Hi EVeryone
January was a cold month and attendance was down considerably last meeting. But those who showed up were certainly impressed with the presentations from Ted Lowe on his Battery Box Temperature Controller and Bob Baker's Stage 1 on how to build an Electric Vehicle. Thanks Ted and Bob!

EV Sales Explanation
After the relentless pursuit of EV excellence that Tesla has provided over the last six years. president Elon Musk was in the business news on Mad Money presented by Jim Cramer the other night. I really like the show so paid keen attention when Jim mentioned how Elon Musk did not present sufficient answers on his latest quarterly conference call. Unfortunately he blamed a drop in January business on odd things like customers being on vacation, and he sidestepped some pointed questions about the sales figures.
I have reviewed and presented EV sales figures for the last several years during the FVEAA meeting and my opinion of the reason there is a drop in January sales because of three basic factors

1) Anyone looking to purchase an EV near the end of the year will probably do so by end of December so they can take advantage of the Federal government's (up to) $7,500 tax credit toward the purchase price of an EV in April by Tax day. Waiting until January to buy an EV means waiting over a year to reap the credit benefits.
2) January weather is notoriously bad and folks prefer to buy when it warms up

3) The drop in gasoline prices slows down sales of electric vehicles as drivers pay less at the pumps





January 2015 had a large drop in EV sales of 46% to 3977, according to the figures in http://www.hybridcars.com/january-2015-dashboard/ and Tesla led the way with 1300 vehicles sold. The only EV that had an increase was the Ford Focus Electric which sold 85 cars.

January was bad for **all car sales** in general with an overall drop of 23% from last year, so it wasn't just electrics.
The first chart above shows yearly sales of BEV and PEVs showing a nice increase each year. What that chart doesn't show very well is what happens at the end of each year to the beginning of the next year. So I shifted the months to show Dec to Jan in the middle. That shows the year end drop much more clearly. This year's drop was larger than the last few years, and I believe it was for the reasons stated above. We'll see a steady rise over the year, and if gas prices rise too, then it will certainly continue the same upward trend.

See you at the meeting Friday. Rich Hirschberg coordinated with Cadillac to have a presentation and ride-n-drive for their ELR. And once again Rich Carroll will provide an informative presentation on alternative battery chemistries for EV batteries.

MEMBERSHIP
if you are interested in "club promotions" such as putting ads in newspapers, getting the word out in social media, making phone calls to previous members, inviting other groups to meetings or sending a newsletter to someone new, let me know. Let's pump membership back up!

See you Friday!
Sincerely,
Bruce

FVEAA is on Facebook - Like Us! — Grant Gerke

https://www.facebook.com/FoxValleyElectricAutoAssociation

This Month's Presentations

- John W. Walton – VP or Black Dog, and Vice Chair Green Cities presents "ELR the electric Cadillac"
- Lou Scapellato of Heritage Cadillac providing ride-n-drives of the Cadillac ELR
- Rich Carroll – Alternatives and Comparisons of Electric Vehicle Battery Chemistries

EAA Annual Members Meeting

Ted Lowe

Our parent organization, the EAA (Electric Auto Association), holds an annual conference call where members from all over the country call in and hear the latest progress of the EAA. You don't have to be an EAA member to call in. i highly recommend attending the call because there is so much useful and exciting information shared relating to electric vehicles! **Mark your calendars for Saturday, February 28th**, typically from Noon - 2 PM Chicago time. i've posted details in the forums including the call in number and security code for the conference bridge. Join us!

Membership Update

Ted Lowe

We currently have **83** paid-up members which is low historically for the FVEAA. We live in a large metro area with 8 million people and EVs are the latest buzz so we should be able to grow the FVEAA! **Please invite your friends, neighbors, family, colleagues**, etc. to FVEAA meetings and EVents. Volunteer to attend EVents on behalf of the FVEAA (with or without an EV)! Your ideas on how to help grow the FVEAA are welcomed at anytime, thanks! Howard Hansen had a **great idea**… giving an FVEAA membership as a gift!

FVEAA Membership Report
as of 2015-02-16 04:58:08

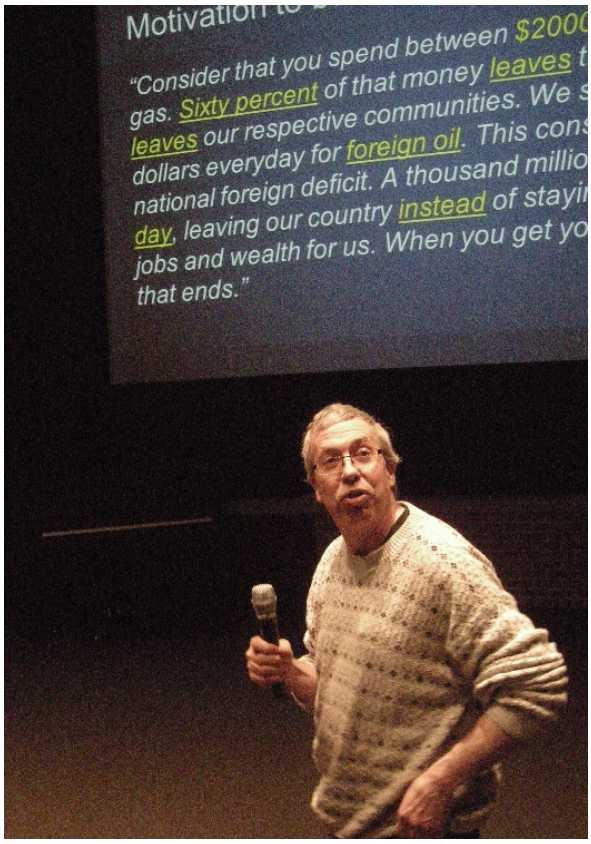
Count of Members by Type

Membership Type	Count	Paid Up
BusinessCharter	1	1
BusinessPremier	1	1
BusinessStd	3	3
Family	10	10
Individual	67	66
LifetimeInd	2	2
Totals	84	83

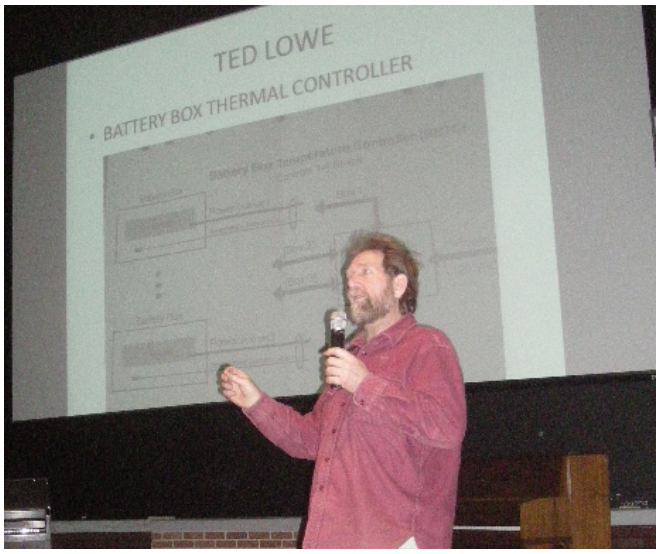
Other Statistics

Statistic	Value
% Paid Up	98.8%
Avg. Paid Up Days	217.6 days
% With Email	95.2%

Photos

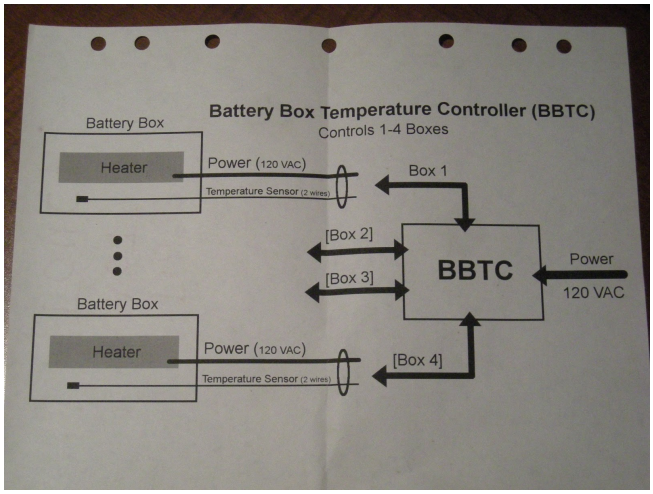


In Presentation #1 of 3, Bob Baker provides excellent insights into how to build an electric car

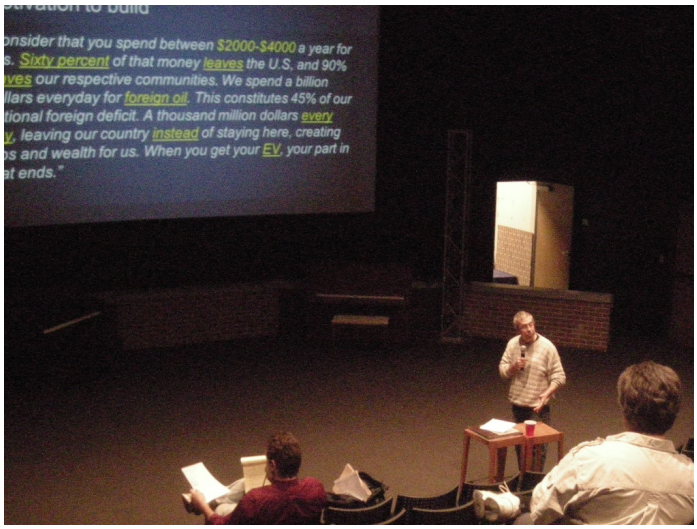


Ted Lowe presents the Battery Box Temperature Controller (BBTC) he designed and built

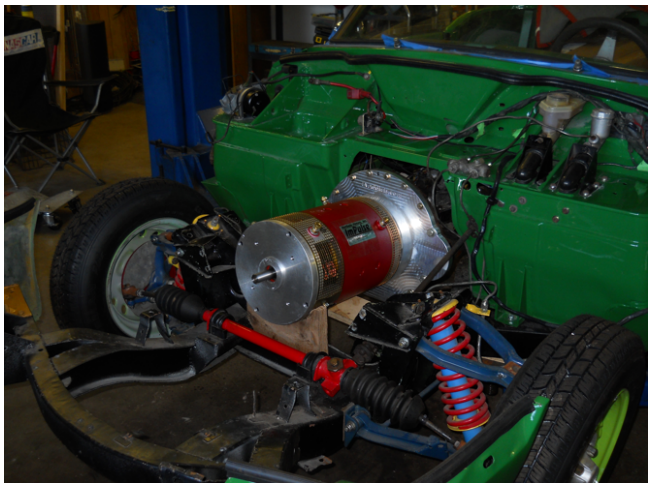
Ted demos the BBTC



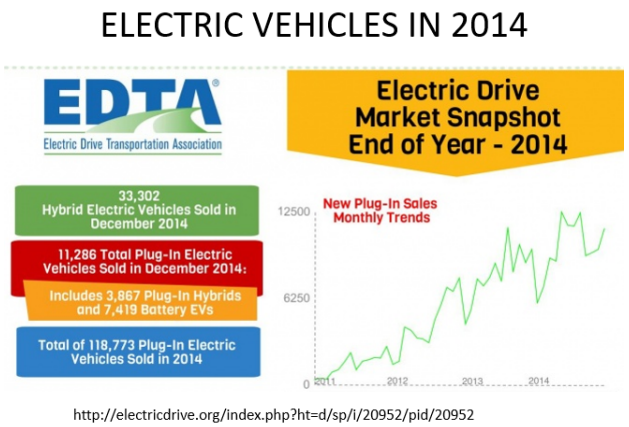
Ted's creation draws a (small) crowd



Bob presents EV building to the core FVEAA



Bob's conversion showing motor mouting



EDTA web site information shows rising EV sales since Dec 2010

Meeting Minutes - *Bruce Jones*

7:15 Committee Reports – none
7:20 No old Business / New business included mention that FVEAA Secretary David Zygmont's work situation is good but very busy and he is unable to continue as Secretary, and will likely be moving. Anyone interested in taking notes at the meeting please see Bruce.
Need volunteer(s) for Promotional committee who will help promote the FVEAA

- Newspaper Ads
- Social Media
- Phone calls to previous members
- Invitations to meetings / EVents
- As a gift give a friend an FVEAA subscription
- Help put CCC Charger on Web Sites

Tesla's Battery Megafactory being built in Nevada, and how it compares to the size of a Boeing jetliner factory

Photos from last month's FVEAA Bill Jacobs BMW - Holiday Party in December
Bruce presented the results of the 2014 FVEAA survey and discussed the top presentations last year and what members want to see this year.

8:00 Ted Lowe discussed his home made Battery Box Temperature Controller and had a working model showing how it worked. Cool demo Ted!
Break
7:45 Presentation by Bob Baker, the 1st of 3 Presentations titled "Stage1 EV Build" describing aspects of converting cars to electric.
Motivation to build an EV
Stage 1 estimated costs
Experiences and tips on how to measure and install

9:15 CLOSE

Rich's Ramblings

Rich Carroll

Critical to sales in the northern half of the US is an availability of 4WD or AWD. Several months of the year snow and ice are prevalent in our driveways, parking lots and alleys. Generally, the interstates are kept clear of deep snow, and then with decreasing order of importance, numbered highways, primary bus transportation routes, arterial streets, and side streets. Many local drivers have sworn, after being stopped by the ice and snow, that they will consider a 4WD or AWD vehicle as their next purchase. Most don't know anything about these advanced drives other than 'all four wheels get power' so getting out of the alley, or over the plow ruts, or into the deep snow of an unplowed lot becomes possible with AWD. Perhaps a look at vehicle physics and the history of 4WD is in order.

Vehicles using 4WD have been available for over 100 years. FWD (Four Wheel Drive Auto Company, later to be known by the parent name Oshkosh) had started building 4WD trucks in 1911. For the next ~50 years, 4WD vehicles had a transfer case in the middle of the vehicle, and connected to the front and rear axles with driveshafts. These drive shafts were geared to run at exactly the same speed, linked 1:1. First of all this meant that at least one wheel on each end would spin in the poor traction of deep snow or mud. For two wheels to get power on either end, the axle on that end must have some locking ability or mechanical means of preventing one wheel from spinning freely. By the 1970's, it was common to option your 4WD truck with a posi-traction, or sure-grip, or limited slip rear differential. With a rear limited slip diff, your 1971 Jeep could only get stuck if three wheels had no traction. Vehicles from this era are notoriously good for their traction in mud, ice, and snow.

Two problems began to emerge as the 4WD vehicle began to lengthen (Jeeps are quite short, commonly with 84 inch wheelbases) and began to be used for highway speeds. Most manufacturers suggested using only 2 WD for the highway, and offered a means of uncoupling the front drive shaft from the transfer case. The handling of a 4WD vehicle in higher speed corners, was at best, somewhat unpredictable. In tight corners, where the front axle travels farther than the rear axle, 4WD would cause some 'lurching' as the tires grabbed the pavement, then suddenly slipped as the tires were required to travel around a different circle in a corner. At higher speeds on loose surfaces, the 4WD vehicle might feel like it understeers, and suddenly change to feeling like it oversteers, as a different tire gained or lost traction.

Jeep (owned by AMC, but a separate division at the time) pioneered QuadraTrac center differentials in their 1972 Jeep Wagoneer. This had a viscous fluid coupling, which acted as a slip-limiting differential in the center, with drive shafts to both front and rear axles. There was a switch in the glove compartment, which could actuate an electric lock to the center differential.

With this development, the Jeep Wagoneer went from an ‘a large vehicle difficult to get stuck’ to a vehicle that was able to handle at higher speeds with an absolutely wonderful, consistent means of handling.

For several years, America had been building toward a world class, international championship in rallying. Up to 1972, sports cars and small sedans were the ultimate vehicle to race down forest roads in northern Michigan. That changed in 1972, the first year the Press On Regardless Rally was a part of the FIA International Championship. Three nights of racing on forest paths showed that AMC sponsored Jeep Wagoneers were first and third, celebrating the **first time ever a 4WD vehicle won in rallying**. Both Wagoneers were called “white whales”, as they were far bigger than the small Datsuns and Porsches that were their main competition. For the International event, the signs “Moby Dick I” and “Moby Dick II” were painted on their sides.

Gene Henderson and Ken Pogue won the event, and Erhard Dahm and Tom Grimshaw were third. Erhard was told after the first night to be a ‘team member’ and keep it on the road so the results would show multiple Wagoneers placing. Before the third night, he was given the task of ‘catching’ the second place car, and he found the fastest way through the heavily forested areas was to slide sideways into trees, and bounce back into the road. This technique only works if the vehicle can withstand this abuse, and the Wagoneer did. Note that we had to tie Grimshaw’s door closed with a seat belt we removed from the back seat. I was fortunate enough to be on the Jeep Team in 1972, and will never forget Grimshaw’s wide eyes on the third night, as he claimed Erhard was obviously trying to kill him. Looking at the side of Moby Dick II, he may have been right. Grimshaw had navigated my POR entry two years earlier, and I knew him well.

From that time on, manufacturers have modified and remodified center differentials on 4WD vehicles to get the best torque split for various surfaces. Recently, some manufacturers have resorted to using advanced computer control on individual wheel brakes to achieve the same effect. Subaru on their World Rally Championship cars uses an adjustable torque split that varies the front:rear torque ratio from 70:30 to 40:60, and this adjustment is from the driver’s seat. And as the system becomes more complex, the name changes from 4WD (which may be able to change to 2WD by disconnecting part of the transfer case) to AWD. It is normally not possible to disengage one driveshaft in AWD.

For 2015, Subaru is using two center differentials, one mechanical unit, and one electronically controlled. Their front:rear torque split is 41:59.

So, why do you care? Let’s consider the newly introduced Tesla P85D, which uses dual motors. The rear motor is 470 HP, and the front motor is 221 HP, for a combined 691 HP!! Because of the difficulties of effectively controlling two motors, and synchronizing the power perfectly, extremely few cars have been built with power in each end. I believe only one production car has been made in the last 50 years with a drive motor in each end, and it was built with extremely limited numbers. (The Citroen 2CV Sahara was in production for 13 years, with less than 700 built) How did they solve the problem of power synchronization? They were able to run the two engines without worry, as each engine produced 12 HP! Even run at maximum power, wheelspin was virtually non existent.

Without effective control over the entire speed/power range of the Tesla, this would be a recipe for disaster, but Tesla seems to have nicely solved the problem by proportioning the effective system with individual brake control. Computer control, with giant brakes, and millisecond response times are essential. Add in the need to capture energy by regeneration while slowing/stopping, Tesla seems to have created a miracle system.

References and further reading:
http://www.4x4abc.com/4WD101/who.html
http://en.wikipedia.org/wiki/Four-wheel_drive#4WD
http://www.novak-adapt.com/knowledge/quadratrac.htm
http://en.wikipedia.org/wiki/Press-on-Regardless_Rally
https://books.google.com/books?id=ntQDAAAAMBAJ&lpg=PA73&ots=ZxPtJlSCn2&dq=finishers%201972%20press%20on%20regardless&pg=PP1#v=onepage&q&f=false
http://www.subaru-global.com/tec_awd.html
http://www.cnet.com/news/not-every-subaru-all-wheel-drive-system-is-created-equal/
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http://en.wikipedia.org/wiki/Citro%C3%ABn_2CV#.27Sahara.27_Four-wheel_drive

Membership Form

Ted Lowe

FVEAA Membership Application Form - Version 2014-01-01
Name:_____
Address:_____
City, State Zipcode:_____
Phone:_____ Phone Type: Home ___ Work ___ Cell ___
Email:_____
Please check one: New Member _____ Renewal _____

How did you hear about the FVEAA ? _____

Membership Types and Annual Dues (please circle one):

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Newsletter Delivery Type (please circle one): No Newsletter Electronic

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